A cost-utility analysis of hypertension treatment in Greece: assessing the impact of age, sex and smoking status, on outcomes
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
The study assessed the cost-effectiveness of hypertension treatment in male and female smokers and non-smokers. The authors concluded that hypertension treatment was a highly cost effective intervention. The methodology was satisfactory. Methods and results were reported adequately. The authors' conclusions appear appropriate, but the quality of the effectiveness data may be an issue. Readers need to keep in mind that the conclusions do not relate to a specific type of hypertension treatment.

Type of economic evaluation
Cost-utility analysis

Study objective
To assess the cost-effectiveness of hypertension treatment in male and female smokers and non-smokers aged 30 to 75 years.

Interventions
Hypertension treatment involved any treatment for hypertension recommended by a physician to their patient. This was compared with a hypothetical no-treatment strategy.

Location/setting
Greece/Primary Care.

Methods
Analytical approach:
A Markov model with a one-year cycle length was constructed to synthesise published literature. The time horizon was 20 years. The authors reported that a third-party payer perspective was adopted.

Effectiveness data:
Effectiveness data were largely based on a Greek prospective observational study on hypertension. The study included 1,511 patients with a diagnosis of primary hypertension who were followed up for one year. The previously published Framingham Heart Study risk equations were used to determine the likelihood of stroke or myocardial infarction. The previously published SCORE risk calculator was used to assess the risk of death due to a cardiovascular event. The main measure of effectiveness was the likelihood of a cardiovascular event.

Monetary benefit and utility valuations:
Health utilities were derived from a published study which used the EQ-5D for their utility valuations.

Measure of benefit:
The measure of benefit was the quality-adjusted-life-year discounted at an annual rate of 3%.

Cost data:
Cost categories included in the study were hypertension treatment costs, follow-up costs and costs of cardiovascular events. Resource use was estimated using the study from which the effectiveness data were drawn. Treatment and follow-up costs were from official social security tariffs and medication costs. The cost of cardiovascular events was
derived from a published study. Costs were presented in 2011 Euros (€) and discounted at an annual rate of 3%.

Analysis of uncertainty:
Uncertainty was investigated through a series of deterministic and probabilistic sensitivity analyses. Monte Carlo simulation was used to examine uncertainty in model inputs with cost-effectiveness acceptability curves generated for various willingness to pay thresholds. One-way sensitivity analyses were carried out on key model inputs.

Results
Results were presented separately for men and women and smokers and non-smokers. Total costs and QALYs for all interventions were presented in the paper. Only the incremental results are presented here.

Compared with no treatment, the incremental cost per QALY gained for hypertension treatment for male smokers was €3,539, the incremental cost per QALY gained for treatment for male non-smokers was €3,986, the incremental cost per QALY gained for treatment for female smokers was €3,957 and the incremental cost per QALY gained for treatment for female non-smokers was €5,485.

One way deterministic analysis showed the results to be most sensitive to the cost of hypertension treatment and health utilities. The likelihood of treatment being cost-effective at a willingness to pay threshold of €30,000 per QALY gained was 97.4% for male smokers, 95.2% for male non-smokers, 94.8% for female smokers and 86% for female non-smokers.

Authors’ conclusions
The authors concluded that hypertension treatment was a highly cost effective intervention.

CRD commentary
Interventions:
The interventions were very briefly described given that the two interventions were very broad treatment or no-treatment strategies. Readers would need to decide whether a no-treatment strategy was applicable to their own setting. Readers needed to keep in mind that the conclusions of this study related to any treatment for hypertension that could be recommended by a Greek physician and may or may not be applicable to the study setting. The treatments available for recommendation by Greek physicians were not described so the generalisability of the study results was unclear.

Effectiveness/benefits:
The effectiveness data were derived mostly from a prospective observational study and this type of study has limitations (most notably a lack of randomisation of patients to treatment options) that may reduce the quality of the estimates included in the study. It was not clear whether both treated and non-treated patients were included in the study. QALYs provided an appropriate benefit measure that captured the impact of hypertension on survival and quality of life and was generalisable to other diseases. Use of the EQ-5D to elicit utility estimates should have ensured good quality estimates; readers needed to refer to the published papers to fully assess the utility estimates.

Costs:
The study perspective was clearly stated. It appeared that the relevant costs were included. The sources of resource use and unit cost data were appropriate for the stated perspective. A limitation of the cost analysis was reporting of costs as category totals rather than individual items, which reduced the transparency of the cost analysis. The costs were appropriately discounted and adjusted for inflation.

Analysis and results:
The analytical approach was appropriate and had an adequate description, which included a diagram. The results were clearly presented, with an incremental approach used appropriately to combine the cost and outcomes of the alternative interventions. Uncertainty was appropriately investigated through one-way and probabilistic sensitivity analysis. The study findings were compared to the results of other published evaluations and found to be similar. The authors discussed some of the limitations of their study.

Concluding remarks:
The methodology was satisfactory. Methods and results were reported adequately. The authors’ conclusions appear
appropriate, but the quality of the effectiveness data may be an issue. Readers need to keep in mind that the conclusions do not relate to a specific type of hypertension treatment.

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